

LoTi Turns Up the HEAT!

The technology-integration survey has been improved to account for new ways of teaching, new digital tools, and Web 2.0.

When LoTi was first introduced in 1994 as the Levels of Technology Implementation framework, the intent was to create a tool to help district leadership quantify how teachers were using technology in the classroom. After serving the past 15 years as a research framework, self-reporting technology integration survey, and school improvement model, LoTi has changed focus.

The original LoTi framework provided an empirically validated model for school systems to gauge the effectiveness of technology implementation. However, with the emergence of new standards from the Partnership for 21st Century Skills and ISTE's NETS•T, it was clear the framework needed to be refreshed. The Levels of Technology Implementation framework thus became the Levels of Teaching Innovation framework. It includes the same stages contained in the original framework, but the newer model emphasizes powerful learning and teaching as well as the use of digital tools and resources in the classroom.

Each level or stage of the new LoTi framework addresses unique attributes of the pedagogical continuum as teachers gravitate from:

- A teacher-centered approach to a learner-centered approach
- Lower levels of student cognition, such as knowledge and comprehension, to higher levels, such as synthesis, evaluation, problem-solving, and issues resolution

- Classroom routines of research-based best practices, such as providing recognition and giving feedback, to complex classroom routines, such as generating hypotheses and prompting student questions
- Compliant use of digital tools and resources to dynamic, self-directed uses of Web 2.0 tools

The original LoTi framework was the by-product of two separate initiatives: David Dwyer's research with Apple Classrooms of Tomorrow (ACOT) and the Concerns-Based Adoption Model (CBAM). ACOT's research provided the theoretical inspiration for the model, and CBAM outlined the changing behaviors and concerns that educators experience as they integrate innovations into their classrooms.

The other two frameworks comprising the LoTi model—current instructional practices (CIP) and personal computer use (PCU)—have also been upgraded based on the NETS•T.

The CIP framework measures classroom teachers' instructional practices relating to a subject matter versus a learner-based instructional approach in the classroom. As one moves to a higher CIP intensity level, less emphasis is on didactic instruction, sequential and uniform learning activities, and traditional forms of assessment. In its place, teachers begin to embrace instructional strategies aligned with student-directed learning, varied assessment strategies,

authentic problem-solving opportunities, differentiated instruction, and complex classroom routines, such as generating and testing hypotheses, implementing cooperative learning, and identifying similarities and differences.

The PCU framework measures classroom teachers' fluency level in using digital tools and resources for student learning. As educators move up the PCU intensity level, they become more skilled at using emerging digital tools, such as multimedia, productivity, desktop publishing, and Web-based applications, and their advocacy and commitment levels also increase. Teachers at the highest PCU intensity levels assume leadership roles toward a level of advocacy for effective technology use in their classrooms, school buildings, and the larger global community.

New LoTi Digital-Age Survey

Along with the revised LoTi framework comes the new LoTi Digital-Age Survey, which provides classroom teachers with a valid and reliable snapshot of their LoTi and their CIP and CPU levels as well as a personalized professional development priority profile aligned to the NETS•T. Because the LoTi framework is closely aligned with several national and international initiatives, including Daggett's Rigor and Relevance, Marzano's Research-Based Best Practices, and Webb's Depth of Knowledge, the survey results provide the participant an equivalent score (for example, LoTi 4 = Rigor Relevance Quadrant D) and

H.E.A.T. Framework

H.E.A.T. stands for Higher-order thinking, Engaged learning, Authentic learning, and Technology use. The H.E.A.T. Framework measures the integration of these four factors in classroom instruction.

✓ H.E.A.T. Intensity Level 1

- ◆ H - Students taking notes only; no questions asked
- ◆ E - Students report what they have learned only
- ◆ A - The learning experience is missing or too vague to determine
- ◆ T - No technology use is evident

✓ H.E.A.T. Intensity Level 2

- ◆ H - Student learning/questioning at knowledge level
- ◆ E - Students report what they have learned only; collaborate
- ◆ A - The learning experience represents a group of connected
- ◆ T - Technology use is unrelated to the task

✓ H.E.A.T. Intensity Level 3

- ◆ H - Student learning/questioning at comprehension level
- ◆ E - Students given options to solve a problem
- ◆ A - The learning experience provides limited real world relevance
- ◆ T - Technology use appears to be an add-on and is not needed

✓ H.E.A.T. Intensity Level 4

- ◆ H - Student learning/questioning at application level
- ◆ E - Students given options to solve a problem; collaborate with others
- ◆ A - The learning experience provides extensive real world relevance, but does not apply the learning to a real world situation
- ◆ T - Technology use is somewhat connected to task completion involving one or more applications

✓ H.E.A.T. Intensity Level 5

- ◆ H - Student learning/questioning at analysis level
- ◆ E - Students help define the task, the process, and the solution
- ◆ A - The learning experience provides real world relevance and opportunity for students to apply their learning to a real world situation
- ◆ T - Technology use is directly connected to task completion involving one or more applications

✓ H.E.A.T. Intensity Level 6

- ◆ H - Student learning/questioning at synthesis/evaluation levels
- ◆ E - Students help define the task, the process, and the solution; collaboration extends beyond the classroom
- ◆ A - The learning experience is directly relevant to students and involves creating a product that has a purpose beyond the classroom that directly impacts the students
- ◆ T - Technology use is directly connected and needed for task completion and students determine which application(s) would best address their needs

H.E.A.T.



Levels of Teaching Innovation

Level 0—Non-use: Instructional focus ranges from a direct instruction approach to a collaborative, student-centered learning environment. The use of research-based best practices may or may not be evident, but those practices do not involve the use of digital tools and resources.

Level 1—Awareness: Instructional focus emphasizes information dissemination to students using lectures or teacher-created multimedia presentations. Teacher questioning and student learning typically focus on lower cognitive skill development. Digital tools and resources are used for curriculum management tasks, to enhance lectures, or as a reward for students who complete class work.

Level 2—Exploration: Instructional focus emphasizes content understanding and supports mastery learning and direct instruction. Teacher questioning and student learning focus on lower levels of student cognitive processing. Students use digital tools for extension activities, enrichment exercises, or information-gathering assignments that generally reinforce lower cognitive skill development. Students create multimedia products to demonstrate content understanding in a digital format that may or may not reach beyond the classroom.

Level 3—Infusion: Instructional focus emphasizes higher-order thinking (application, analysis, synthesis, evaluation) and engaged learning. Teacher-centered strategies include the concept attainment, inductive thinking, and scientific inquiry models and guide the types of products the students generated. Students use digital tools and resources to carry out teacher-directed tasks that emphasize higher levels of student cognitive processing.

Level 4a—Integration (mechanical): Students are engaged in exploring real-world issues and solving authentic problems using digital tools and resources, but the teacher may experience classroom management or school climate issues, such as lack of support from colleagues, that restrict full-scale integration. Teachers rely on prepackaged materials, assistance from other colleagues, or professional development workshops. Emphasis is on applied learning and the constructivist, problem-based models of teaching that require higher levels of student cognitive processing and in-depth examination of the content. Students use digital tools and resources to investigate student-generated questions that dictate the content, process, and products embedded in the learning experience.

Level 4b—Integration (routine): Students are fully engaged in exploring real-world issues and solving authentic problems using digital tools and resources. Teachers are within their comfort levels promoting inquiry-based models of teaching that involve students applying their learning to the real world. Emphasis is on learner-centered strategies that promote personal goal setting and self-monitoring, student action, and issues resolution that require higher levels of student cognitive processing and in-depth examination of the content. Students use digital tools and resources to investigate student-generated questions that dictate the content, process, and products embedded in the learning experience.

Level 5—Expansion: Students collaborate beyond the classroom to solve problems and resolve issues. Emphasis is on learner-centered strategies that promote personal goal setting and self-monitoring, student action, and collaborations with other diverse groups, such as people from another school, another culture, a business, or a governmental agency. Students use digital tools and resources to answer student-generated questions that dictate the content, process, and products embedded in the learning experience. The complexity and sophistication of the digital resources and collaboration tools used in the learning environment are now commensurate with the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach to teaching and learning and the students' level of complex thinking (analysis, synthesis, evaluation) and in-depth understanding of the content experienced in the classroom.

Level 6—Refinement: Students regularly collaborate beyond the classroom to solve problems and resolve issues. The instructional curriculum is entirely learner based. The content emerges based on the needs of the learners according to their interests, needs, and aspirations and is supported by unlimited access to the most current digital applications and infrastructure available. There is no longer a division between instruction and digital tools and resources. The pervasive use of, and access to, advanced digital tools and resources provides a seamless medium for information queries, creative problem solving, student reflection, and product development. Students have ready access to, and a complete understanding of, an array of collaboration tools and related resources.

aligned professional development interventions for each of these frameworks.

The LoTi Digital-Age Survey is available free to every public school educator in the United States thanks to a cadre of corporate sponsors. Since the survey's inception in 1995, more than a million educators have completed the LoTi survey as part of a research study, district technology plan, federal or state grant, or individualized professional development plan. Educators can take the New LoTi Digital-Age Survey at www.loticonnection.com/lotitake.html.

Turning up the H.E.A.T. on LoTi

Many educators are familiar with the video based on the book *212: The Extra Degree* and its message that increasing the temperature of our ambitions, performances, and goals in life by one degree can make a huge difference. Last year, I introduced the concept of 212 degrees in teaching to illustrate how the amount of H.E.A.T. we are generating from our classroom instructional practices affects the level of student engagement in the classroom. Increasing the H.E.A.T.—higher-order thinking, engaged learning, authenticity, and technology use—in the classroom can make a huge difference by elevating the LoTi level, promoting greater rigor and relevance, and, most important, engaging digital natives trapped in a Teach 1.0 learning paradigm.

Using the H.E.A.T. framework, school leaders and classroom teachers can look to the tenets of the NETS•S when creating lesson plans, conducting classroom walkthroughs, engaging in peer observations, or designing 21st-century performance assessments. Whereas LoTi focuses on what the teacher is doing in the classroom, H.E.A.T. measures its effects on the learner. Free copies of the H.E.A.T. observation form and H.E.A.T. rubric are available at the LoTi Connection

website (http://loticonnection.com/pdf/HEAT_Form.pdf).

LoTi's Reach

Dissertations. To date, more than 60 doctoral dissertations that have used the LoTi framework as the basis for their research design have been published worldwide. These research studies break new ground for identifying which instructional and administrative routines have the greatest effect on technology implementation practices in the classroom. Information and procedures for using the LoTi framework for dissertation studies are on the LoTi Connection website at <http://loticonnection.com/dissertations.html>.

Curriculum alignment. The critical elements comprising the stages of the LoTi framework are evident in the current wave of curriculum models and initiatives dominating the educational landscape. Many of these models and initiatives, including Daggett's Rigor/Relevance, Webb's Depth of Knowledge, Marzano's Research-based Best Practices, and 21st-century skills, address one or more of the underpinnings of LoTi. Taken collectively, they represent the entire LoTi framework. Find a detailed chart showcasing the curriculum models and initiatives at <http://loticonnection.com/research.html>.

School improvement model. LoTi Digital-Age Schools use the critical components of 21st-century learning (critical thinking, collaboration, problem solving, and self-directed

investigations) to increase student academic achievement in core content areas based on targets outlined in the No Child Left Behind Act while promoting advanced technology use in the classroom.

The outcome of becoming a LoTi Digital Age School is increased student engagement, a higher level of technology implementation in each classroom, and improved student achievement. Though LoTi Digital-Age Schools vary in size, demographics, and grade levels, they all retain the common vision that elevating the LoTi experience in the classroom can transform dormant teacher-centered classrooms into engaging venues for student inquiry that ultimately lead to improved student achievement on statewide tests. For more on the LoTi Digital-Age Schools, go to <http://loticonnection.com/collaborations.html>.

During the past four years, more than 50 target schools across the country have annually used the tenets of digital-age literacy and research-based best practices coupled with the LoTi Implementation Cycle (Assess, Plan, Implement, Sustain) to promote continuous improvement efforts at the classroom level, elevate student engagement, and document improved student achievement in the core content areas.



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